



Emblica officinalis Gaertn

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Taxonomy and nomenclature

Species name: *Emblica officinalis* Gaertn.

Family: Euphorbiaceae

Synonym(s): *Phyllanthus emblica* Linn., *Cicca emblica* Kurz.

Vernacular/Common name: Emblic myrobalan, Indian gooseberry, malacca tree (English), Aonla, amla (India), *mak kham bom* (Lao/Thai), *melaka* (Malay), *zee phyu thee* (Myanmar), ganlanshu (Chinese), kimalaka (Indonesian).

Distribution and habitat

The tree is native to tropical southeastern Asia, particularly in central and southern India, Pakistan, Bangladesh, Ceylon, Malaya, southern China and the Mascarene Islands. It grows up to an elevation of 1800 m. The range of temperature is 0-46°C with annual rainfall from 700 to 1500 mm. It is found on a variety of soils, including poor, gravelly and dry soils, but prefers a deep, moist loam soil and flourishes on alluvial soil. It can be successfully cultivated from slightly acidic to saline-sodic soils between pH 6.5-9.5. The species is considered suitable for reclaiming bauxite-mined areas.

Botanical description

Emblica officinalis is a small to medium sized deciduous tree with feathery light green foliage reaching a height of 18 m and a girth of 2.1 m. Bark is smooth, greenish grey, exfoliating in irregular rounded scales, red inside. Leaves are small, 7-25 mm long and 2-4 mm wide, linear oblong, distichously set on deciduous branchlets, having the appearance of pinnate leaves. Flowers are small, greenish yellow in auxiliary clusters and unisexual. Male flowers numerous on short slender pedicels, female flowers few, have 3-celled ovary.

Use

The timber is used for agricultural implements, low-cost furniture, for lining wells and as fuelwood. Foliage is used as fodder for cattle although rich in tannin. The fruit is a rich source of vitamin C; fruit juice contains 20 times more vitamin C than orange juice. The fruit is also used in jams and pickles, but is especially important for its medicinal use (cf. species epithet *officinalis*). Various drugs prepared from the fruit for treatment of chronic infection of ear, nose and throat, enlarged liver, stomach ailments, jaundice. The seeds are used in asthma, bronchitis, diabetes and fevers. Seeds yield oil

w/ high viscosity. Fruits are used in dyes, dried fruits are detergent and used for washing hair. The branches of the tree are lopped for green manure for neutralizing soil alkalinity.



Emblica officinalis with fruits.

Fruit and seed description

Fruits: Round or oblate, almost sessile, firm, 2-5 cm in diameter 3-celled drupe, indented at the base, and smooth, though 6 to 8 pale lines, extending from the base to the apex, giving it the appearance of being divided into segments or lobes. As the fruits mature they become whitish or dull, greenish-yellow, or occasionally brick red. The skin is thin, translucent and adherent to the very crisp, juicy flesh. Ripe fruits are astringent, extremely acid, and some are distinctly bitter.



Seeds: The endocarp is a slightly hexagonal 3-celled stone containing 6 trigonous small seeds. Seeds are kidney-shaped, shining and reddish brown. Seed weight 50-70,000 seeds per kg or 1000 psw 15-20 grams.



Grafted fruit trees may start flowering after 5-6 years and trees normally bear for about 50 years. Trees are primarily monoecious, occasionally dioecious. In India greenish yellow flowers appear from March to May soon after the appearance of new leaves in March – April. Variation in flowering behaviour has been observed in different varieties/cultivars. Fruits ripen from November to April. In some areas, the tree blooms in June-July and again in February-March, the second flowering producing only a small crop. In Florida flowering occurs during the summer months (June-July), the main crop maturing during the winter and early spring. A few fruits developing from late blooms are found in summer and fall. The yield per plant is low in wild varieties (about 25 kg), whereas in cultivated varieties it can easily yield 150-200 kg/plant. Fruit yield is favoured by cross pollination, which is performed primarily by bees.

Seed collection

Fresh fruits are collected from the trees. The optimum period of collection is when the color of the fruit turns white or greenish yellow. The collection method is to spread a tarpaulin under the tree and collect the fruits by shaking the trees or lopping the branches or plucking.

Processing and handling

Seeds are extracted by drying the ripe fruits until the fleshy covering dries up and hard stones split open to free the seeds. Alternatively, the fruits are soaked in water for few days till the pulp softens, then soaked fruits are macerated gently by pounding them in a mortar with a pestle to remove the pulp. If the fruits are put in a jute bag the pulp may also decompose faster (two to three days). Fruits are rubbed manually to separate the stones. Stones are washed thoroughly and seeds are then extracted from the stones that easily crack after drying. Seeds are cleaned by a gravity separator or by winnowing. 80-85 kg of fruits yields about 1 kg seed.

Dormancy and pretreatment

Germination percentage is low in fresh seeds (4-20%). Dry storage for one year at ambient condition with 4-7% moisture content has increased the germination percentage up to 85%; during cold storage this germination was only reached after more than 4 years. Pretreatment with plant growth regulators has very little effect on this type of dormancy. The observation suggests need for a period of after-ripening.

Storage and viability

Seeds are of orthodox type and tolerate desiccation to 4-5% moisture content. The seeds can be stored for long periods (more than six years) if stored at low temperature or below freezing (-20°C to 15°C) even with wide range of moisture contents (4-12%). But seed viability will decline after two years of storage at ambient condition at any moisture content.

Sowing and germination

Germination is epigeal. Seeds are sown in seed beds 10 cm apart in the month of March. Watering should be done profusely in the evening. Seedlings of 5-10 cm length are transplanted into polythene bags. Plants of about 2 cm collar diameter are transplanted with ball of earth in the field in second year in the monsoon (July-August).

Phytosanitary problem

The most serious pest of this tree in India is the bark-eating caterpillar, *Inderbella* sp., which tunnels into the branches and trunk. A non-pathogenic problem called “fruit necrosis”, characterized by internal browning which gradually extends to the surface where dark spots appear with a corky and rubber-like appearance. Apart from this, the fungi, *Bestonea stylophora*, *Phakospora phyllanthi* and *Ravenelia emblicae* cause ring rust, leaf rust and fruit rot. Fresh fruits on the market or in storage are subject to blue mould and rotting caused by *Penicillium islandicum*. Rinsing with a very diluted borax or sodium chloride solution helps to reduce such decomposition.

Selected readings

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